

## CLAIMS:

1. A dielectric composition comprising a mixture of:
- a ceramic composition containing  $\text{Ba}_a\text{RE}_b\text{Ti}_c\text{O}_3$ , wherein RE represents a rare earth element, with  $0.05 \leq a \leq 0.25$ ,  $0.525 \leq b \leq 0.70$ ,  $0.85 \leq c \leq 1.0$ , and  $2a + 3b + 4c = 6$ , and free from lead and bismuth,
  - 5 - a glass composition comprising  $\text{SiO}_2$ , a bivalent metal oxide chosen from the group consisting of  $\text{MgO}$  and  $\text{ZnO}$  and at least 10% by weight with respect to the glass composition of a further metal oxide chosen from the group consisting of  $\text{Li}_2\text{O}$  and  $\text{TiO}_2$ , and
  - a metal oxide which is different from the bivalent metal oxide present in the glass composition.
- 10
2. A dielectric composition as claimed in Claim 1, characterized in that the metal oxide in the dielectric composition is an oxide of a metal chosen from the group consisting of magnesium, zinc, copper, manganese, cobalt, iron, nickel, erbium, holmium, indium, dysprosium, tungsten and yttrium.
- 15
3. A dielectric composition as claimed in Claim 1, characterized in that the further metal oxide in the glass composition is  $\text{Li}_2\text{O}$ .
4. A dielectric composition as claimed in Claim 3,
- 20 characterized in that the glass composition essentially consists of 50-80% by weight of  $\text{SiO}_2$ , 5-25% by weight of at least one alkaline earth metal oxide including  $\text{MgO}$ , and 10-25% by weight of  $\text{Li}_2\text{O}$ , and in that it is substantially free from boron.
5. A dielectric composition as claimed in Claim 4,
- 25 characterized in that the alkaline earth metal oxide is primarily  $\text{MgO}$ .
6. A dielectric composition as claimed in Claim 1, characterized in that the bivalent metal oxide in the glass composition is  $\text{ZnO}$ , and in that the further metal oxide is  $\text{TiO}_2$ .

Sub 7 7. A dielectric composition as claimed in Claim 1, 3, 4 or 6, characterized in that the glass composition is present in an amount of 3 to 5% by weight with respect to the ceramic composition.

5 8. A method of manufacturing a ceramic multilayer element comprising the steps of

- manufacturing a multilayer stack comprising a first ceramic foil, a first electrode comprising Cu, a second ceramic foil, and a second electrode comprising Cu, which ceramic foils are manufactured from a dielectric composition comprising a ceramic composition and a glass composition comprising  $\text{SiO}_2$ , which ceramic composition contains  $\text{Ba}_a\text{RE}_b\text{Ti}_c\text{O}_3$ , wherein RE represents a rare earth element, with  $0.05 \leq a \leq 0.25$ ,  $0.525 \leq b \leq 0.70$ ,  $0.85 \leq c \leq 1.0$ , and  $2a + 3b + 4c = 6$ , the ceramic composition being free from lead and bismuth; and

10 - sintering the multilayer stack, characterized in that

- the glass composition contains a bivalent metal oxide chosen from the group consisting of MgO and ZnO and at least 10% weight with respect to the glass composition of a further metal oxide chosen from the group consisting of  $\text{Li}_2\text{O}$  and  $\text{TiO}_2$ ,

15 - the dielectric composition further contains a metal oxide which is different from the bivalent metal oxide present in the glass composition, and

20 - the multilayer stack is sintered at a temperature of between 900 and 1080 °C and in an atmosphere which is non-oxidizing for Cu.

25 9. An electronic device comprising a first dielectric ceramic layer, a first electrode comprising Cu, and a second electrode, characterized in that the first dielectric ceramic layer is a sintered body comprising:

- a ceramic composition containing  $\text{Ba}_a\text{RE}_b\text{Ti}_c\text{O}_3$ , wherein RE represents a rare earth element, with  $0.05 \leq a \leq 0.25$ ,  $0.525 \leq b \leq 0.70$ ,  $0.85 \leq c \leq 1.0$ , and  $2a + 3b + 4c = 6$ , and free from lead and bismuth,

30 - a glass composition comprising  $\text{SiO}_2$ , a bivalent metal oxide chosen from the group consisting of MgO and ZnO and at least 10% by weight with respect to the glass composition of a further metal oxide chosen from the group consisting of  $\text{Li}_2\text{O}$  and  $\text{TiO}_2$ , and

00023605-080701

a metal oxide which is different from the bivalent metal oxide present in the glass composition.

10. An electronic device as claimed in Claim 9,  
5 characterized in that the first dielectric ceramic layer is present as a substrate.

add  
C2

09923605-080701  
T04080-50982660